ifm electronic

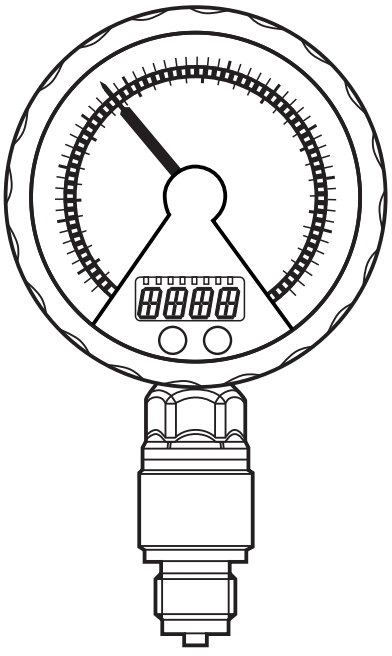
CE

Operating instructions
Electronic manometer

efectorsoo

PG24xx

UK



704736 / 03 11 / 2010

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1 Preliminary note

1.1 Symbols used

▶ Instruction

> Reaction, result

[…] Designation of pushbuttons, buttons or indications

→ Cross-reference

Important note
Non-compliance can result in malfunctions or interference.

Information
Supplementary note.

2 Safety instructions

- Please read this document prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property can occur.
- Check the compatibility of the product materials (→ 12 Technical data) with the media to be measured in all applications.
- Use in gases at pressures > 25 bar only after contacting the manufacturer ifm.
- High-pressure units (250 bar, 400 bar) are supplied with an integrated damping device to comply with the regulations for UL approval and to avoid any risk of injury in case of bursting when bursting pressure is exceeded.

  Any manipulation of the damping device is not permissible.
  When the damping device is removed, there is no damping function any more. ATTENTION: risk of injury!
  For units with cULus approval this approval becomes invalid when the damping device is removed.

For the scope of validity cULus:
The Sensor shall be connected only by using any R/C (CYJV2) cord, having suitable ratings.

The device shall be supplied from an isolating transformer having a secondary Listed fuse rated either
a) max 5 amps for voltages 0~20 Vrms (0~28.3 Vp) or
b) 100/Vp for voltages of 20~30 Vrms (28.3~42.4 Vp).

3 Functions and features

The unit monitors the system pressure in a plant.

3.1 Applications

Type of pressure: relative pressure

Order no.	Measuring range (in brackets: extended display range)		Permissible overpressure		Bursting pressure	
	bar	PSI	bar	PSI	bar	PSI
PG2409	-1...1 (1.6)	-14.52...14.52 (23.22)	10	145	30	435
PG2450	0...400 (600)	0...5800 (8700)	800	11600	1200	17400

Order no.	Measuring range (in brackets: extended display range)		Permissible overpressure		Bursting pressure	
PG2451	0...250 (400)	0...3625 (5800)	600	8700	1000	14500
PG2452	0...100 (160)	0...1449 (2322)	300	4350	700	9400
PG2453	-1...25 (40)	-14.5...362.5 (580.0)	100	1450	350	5070
PG2454	-1...10 (16)	-14.4...145 (232)	50	725	150	2175
PG2455	-1...4 (6.4)	-14.5...58 (92.8)	30	435	100	1450
PG2456	-0.125...2.5 (4)	-1.8...36.25 (58.00)	20	290	50	725
PG2457	-0.05...1 (1.6)	-0.72...14.5 (23.20)	10	145	30	435
	mbar	inH2O	bar	inH2O	bar	inH2O
PG2458	-12.5...250 (400)	-5.0..100.4 (160.6)	10	4015	30	12044
PG2489	-5...100 (160)	-2.00...40.16 (64.24)	4	1606	30	12044

Avoid static and dynamic overpressure exceeding the given overload pressure by taking appropriate measures.
The indicated bursting pressure must not be exceeded.
Even if the bursting pressure is exceeded only for a short time, the unit may be destroyed. ATTENTION: risk of injury!
Use in gases at pressures > 25 bar only after contacting the manufacturer ifm.

4 Function

4.1 Processing of the measured signals

- The unit generates 2 output signals according to the parameter settings.

OUT1	• Switching signal for system pressure limit value.
OUT2	• Analogue signal (4...20 mA, 20...4 mA).

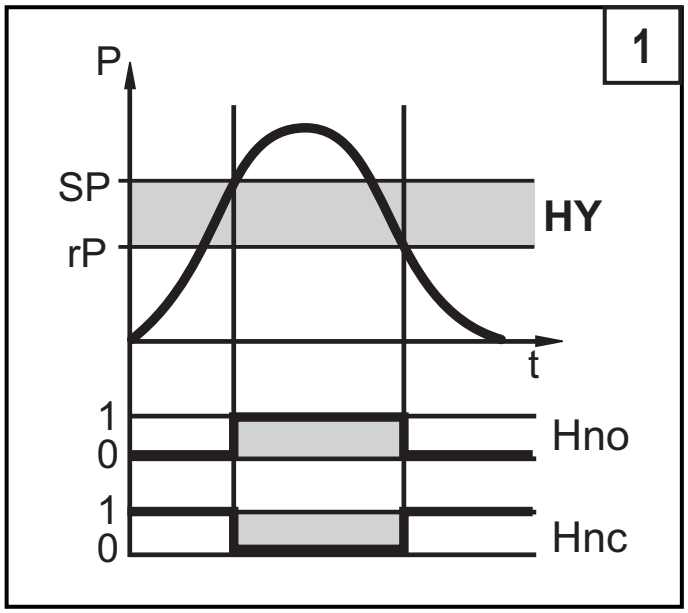
- The unit displays the current system pressure.

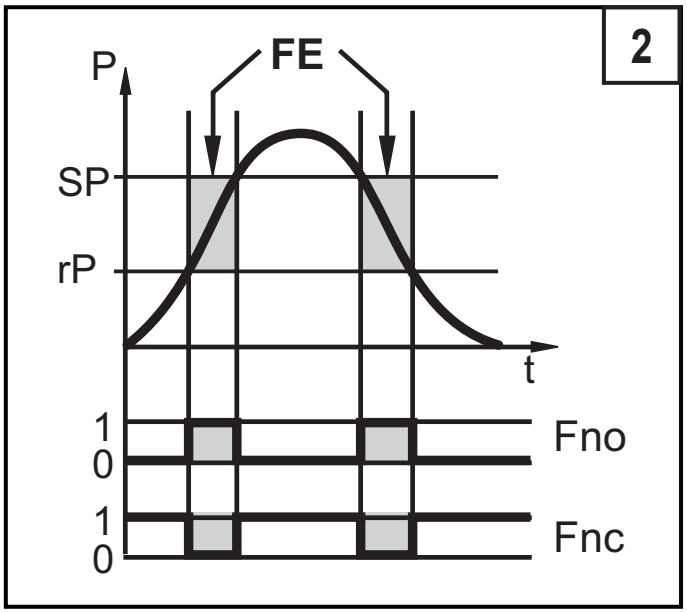
• Analogue display: circular scale with pointer; in addition: - Trend display (rising pressure / falling pressure). - Display of set point and reset point. - Maximum value memory and minimum value memory. - System pressure above the measuring range / in the extended display range.
• Digital display (alphanumeric display, 4 digits).

4.2 Pressure monitoring / switching function

OUT1 changes its switching state if it is above or below the set switching limits (SP1, rP1). The following switching functions can be selected:

- Hysteresis function / normally open: [OU1] = [Hno] (→ fig. 1).
- Hysteresis function / normally closed: [OU1] = [Hnc] (→ fig. 1).
  First the set point (SP1) is set, then the reset point (rP1) with the requested difference.
- Window function / normally open: [OU1] = [Fno] (→ fig. 2).
- Window function / normally closed: [OU1] = [Fnc] (→ fig. 2).
  The width of the window can be set by means of the difference between SP1 and rP1. SP1 = upper value, rP1 = lower value.





P = system pressure; HY = hysteresis; FE = window

4.3 Pressure monitoring / analogue function

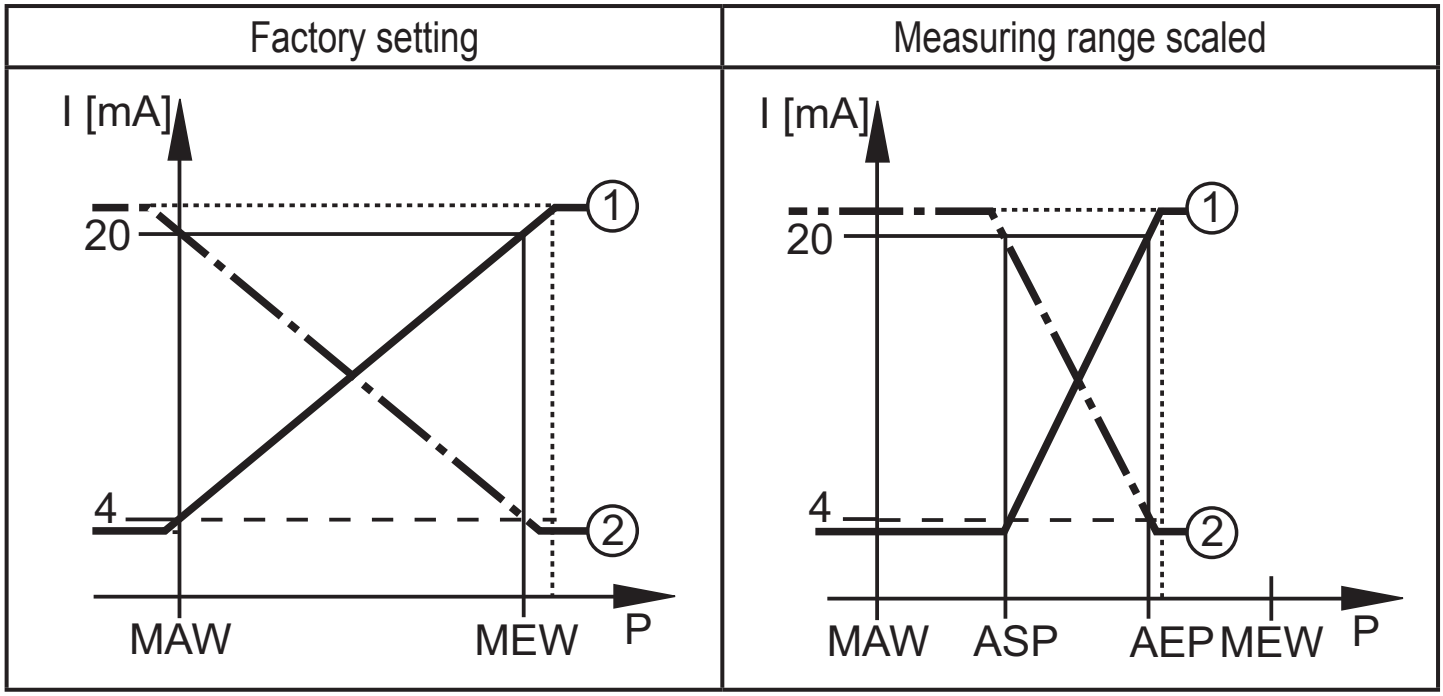
The analogue output can be configured.

- [OU2] defines whether the set measuring range is provided as 4...20 mA ([OU2] = [I]) or as 20...4 mA ([OU2] = [InEG]).

Scaling can be set by means of the teaching process or by entering a value for the ASP and AEP parameters.

- Teaching the analogue start point [tASP] or setting the parameter [ASP] defines at which measured value the analogue signal is 4 mA (20 mA at [InEG]).
- Teaching the analogue end point [tAEP] or setting the parameter [AEP] defines at which measured value the output signal is 20 mA (4 mA at [InEG]).

Minimum distance between [ASP] and [AEP] = 25 % of the final value of the measuring range.



P = system pressure , MAW = initial value of the measuring range, MEW = final value of the measuring range

①: [OU2] = [I]; ②: [OU2] = [InEG]

In the set measuring range the output signal is between 4 and 20 mA ([OU2] = [I]) or between 20 and 4 mA ([OU2] = [InEG]).

It is also indicated:

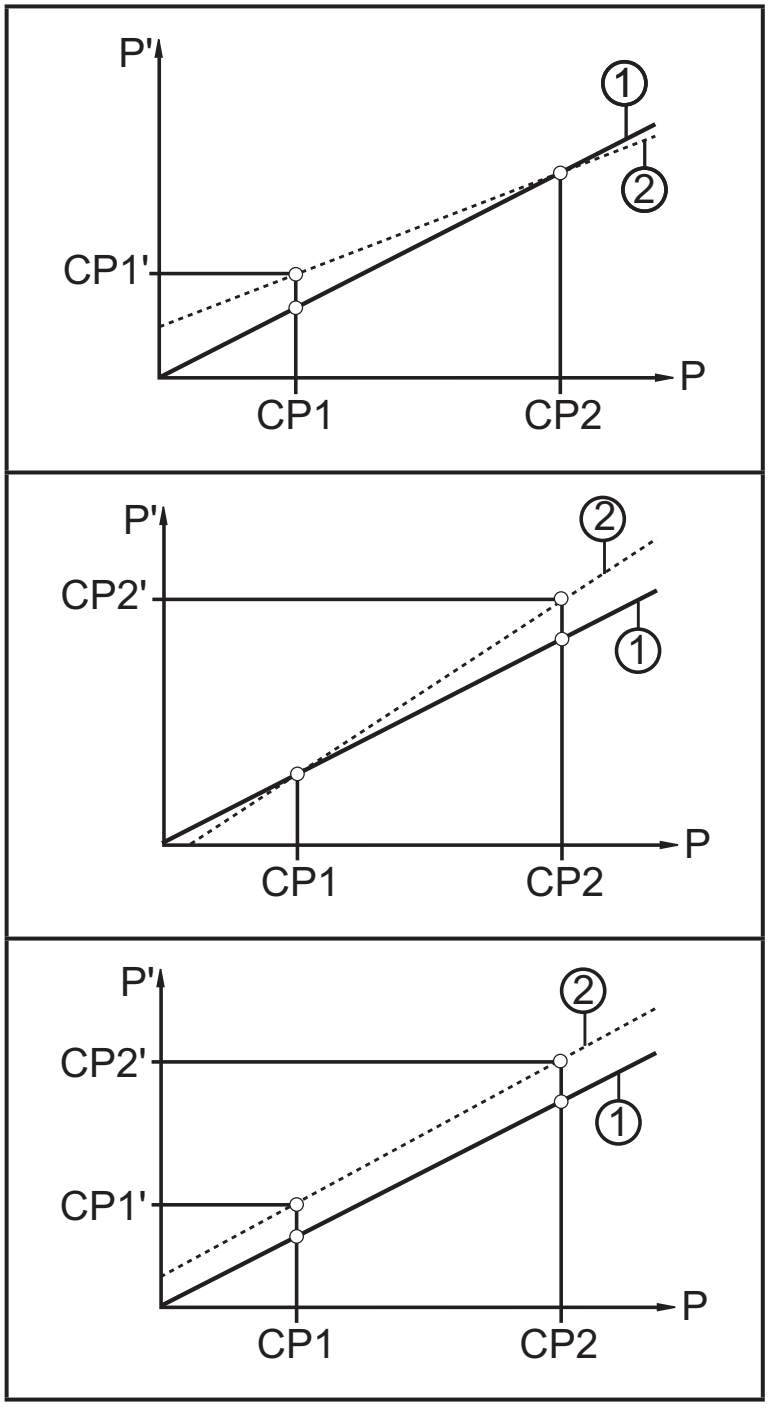
- System pressure above the measuring range:
  - Output signal 20 to 20.5 mA at [OU2] = [I].
  - Output signal 4 to 3.8 mA at [OU2] = [InEG].
- System pressure below the measuring range:
  - Output signal 4 to 3.8 mA at [OU2] = [I].
  - Output signal 20 to 20.5 mA at [OU2] = [InEG].

4.4 Customer-specific calibration

The customer-specific calibration changes the curve of measured values compared to the real measured values (shifting / change of the gradient; → 9.4.6 [CAL]).

- Two calibration points can be defined (CP1, CP2). The two points are independent of each other. They must be within the measuring range and not in the extended display range.
- The zero point calibration [COF] influences the calibration of the curve of measured values. Recommendation: set [COF] to 0 (→ 9.4.1 [COF]), then calibrate the curve of measured values.

After a change the calibration can be reset to factory setting (→ 9.5.2 [rES]).



- P = measured pressure;
  P‘ = modified measured value
- CP1 = calibration point 1;
  CP1‘ = modified measured value for CP1
- CP2 = calibration point 2;
  CP2‘ = modified measured value for CP2
- 1 = curve of measured values at factory setting
- 2 = curve of measured values after calibration

5 Installation

Before installing and removing the unit: make sure that no pressure is applied to the system. Note: If 0% is displayed and no pointer is visible, this does not mean that no pressure is applied to the system !

We recommend horizontal installation for high medium temperatures.

The unit can be fixed to different process connections. Options are as follows:

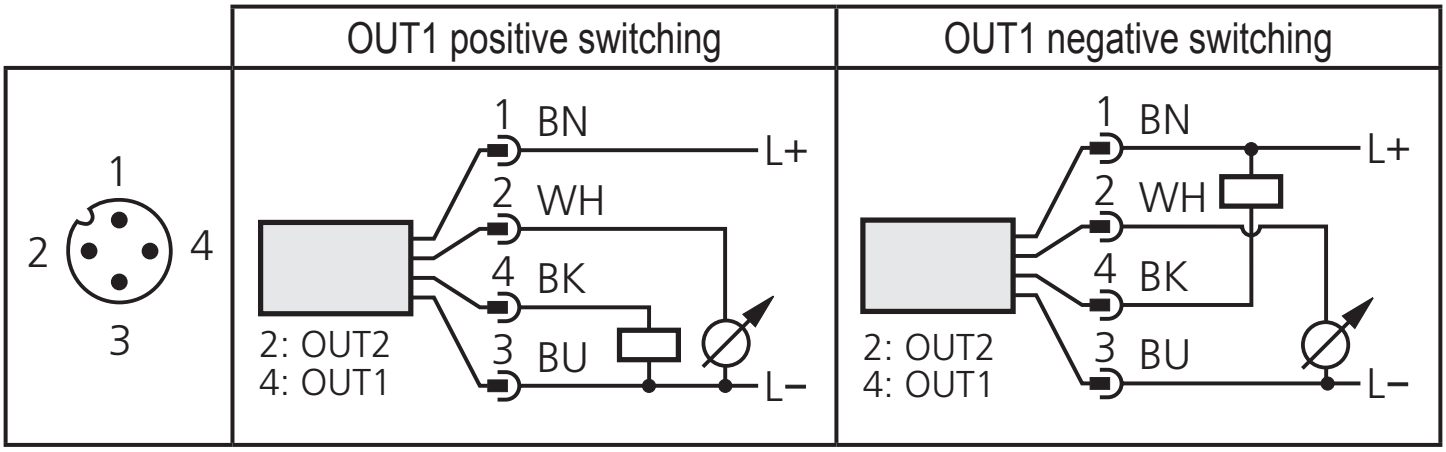
1	**Installation with seals to DIN EN 837-1**
	▶ Insert the unit and the seal into the process connection with cylindrical pipe thread G½ and tighten. All seals to DIN EN 837-1 can be used if they are suitable for process connections with cylindrical pipe thread, e.g. flat seals or double-edge sealing rings.
2	**Installation with sealing tape**
	▶ Insert the unit and the sealing tape into the process connection with G½ internal thread (e.g. welding adapter) and tighten.
3	**Installation at flange G½ (based on DIN 3852-11)**
	The sealing ring on the sensor is used as process seal. The upper sealing area on the process connection must be flush with the tapped hole and have a surface characteristic of min. Rz 6.3. ▶ Grease the sensor thread with a suitable paste. ▶ Insert the unit into the process connection. ▶ Tighten it using a spanner. Tightening torque: 35 Nm.

After installation the analogue display can be rotated / adapted to the installation position (to do so wear protective gloves).

6 Electrical connection

The unit must be connected by a qualified electrician.
The national and international regulations for the installation of electrical equipment must be adhered to.
Voltage supply according to EN 50178, SELV, PELV.

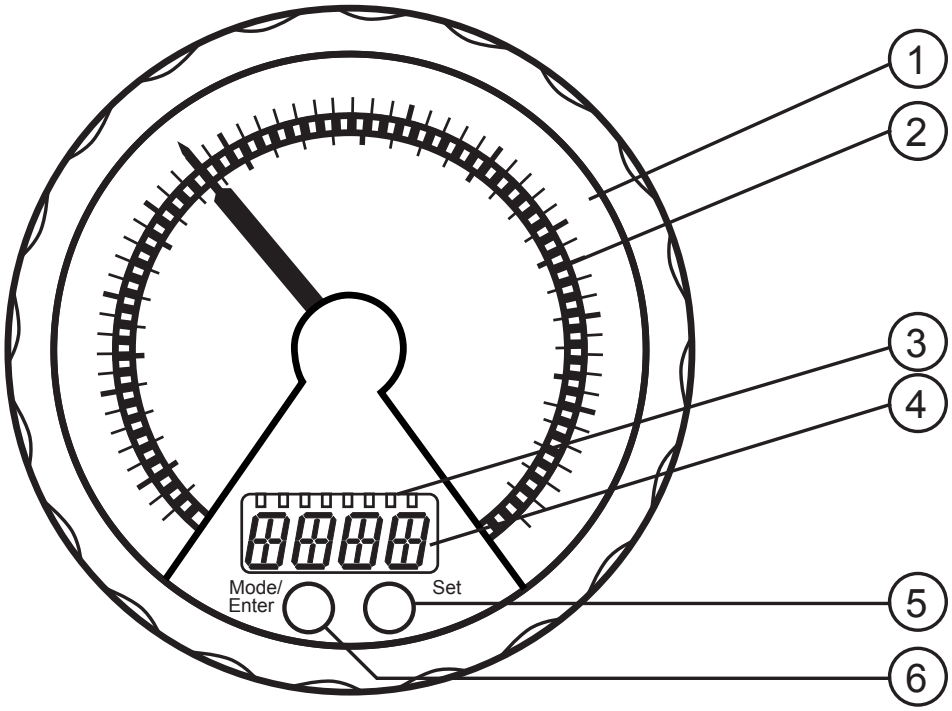
▶ Disconnect power.
▶ Connect the unit as follows:



Pin 1	Ub+
Pin 3	Ub-
Pin 4 (OUT1)	• Binary switching output pressure monitoring
Pin 2 (OUT2)	• Analogue output for system pressure

Core colours of ifm sockets:
1 = BN (brown), 2 = WH (white), 3 = BU (blue), 4 = BK (black)

7 Operating and display elements



UK

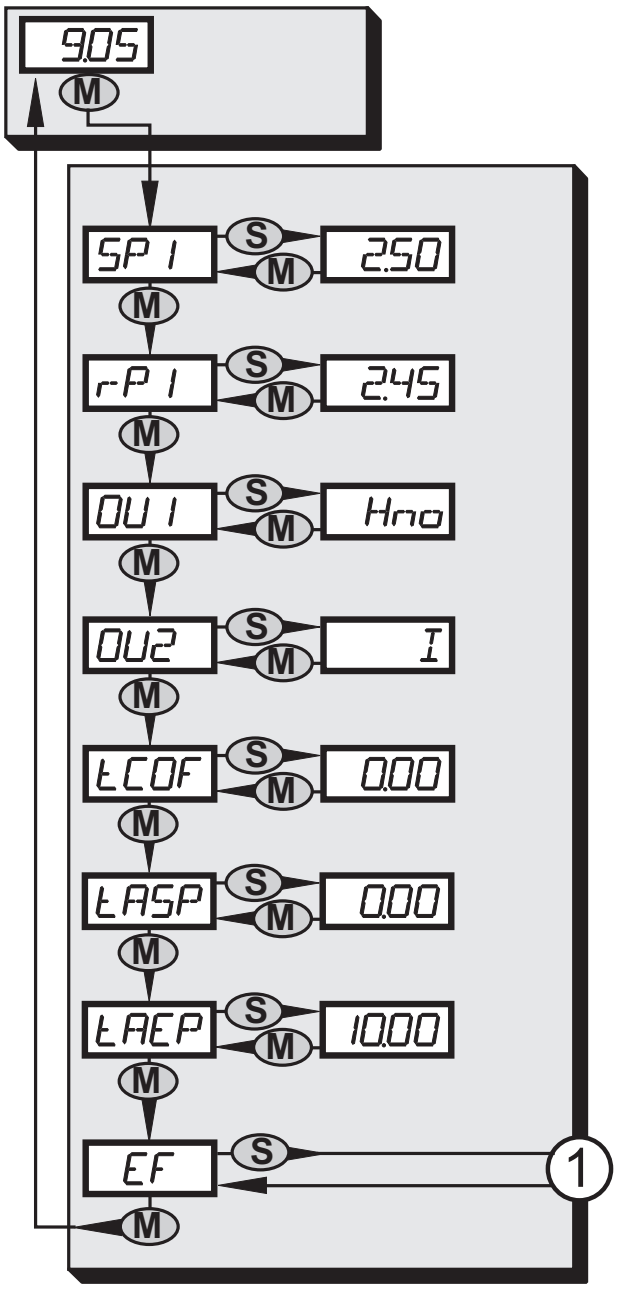
1: Analogue display
- Display of the current system pressure in bar and PSI or mbar and inH2O.
2: LED ring
- Display of set point and reset point. - Trend display: rising pressure (5 LEDs below the pointer) / falling pressure (5 LEDs above the pointer). - Maximum value memory or minimum value memory.
3: Indicator LEDs
- LED 1 = system pressure of the digital display in bar. - LED 2 = system pressure of the digital display in mbar. - LED 3 = system pressure of the digital display in PSI. - LED 6 = system pressure in % of the scaling (range ASP to AEP) or COF value in %. - LEDs 4, 5, 7 = not used. - LED 8 = switching status OUT1 (lights if output 1 is switched)
4: Alphanumeric display, 4 digits
- Display of the current system pressure. - Display of the parameters and parameter values.
5: Touch button Set*
- Setting of the parameter values (continuously by touching permanently; step by step by touching briefly several times).

6: Touch button Mode/Enter*
- Selection of the parameters and acknowledgement of the parameter values.

* The two touch buttons are activated simply by touching / deactivated by releasing the touch button.
The touch button must be completely covered to be activated.
Slow covering (e.g. liquid flows over the display) does not activate the touch button.

8 Menu

8.1 Menu structure: main menu

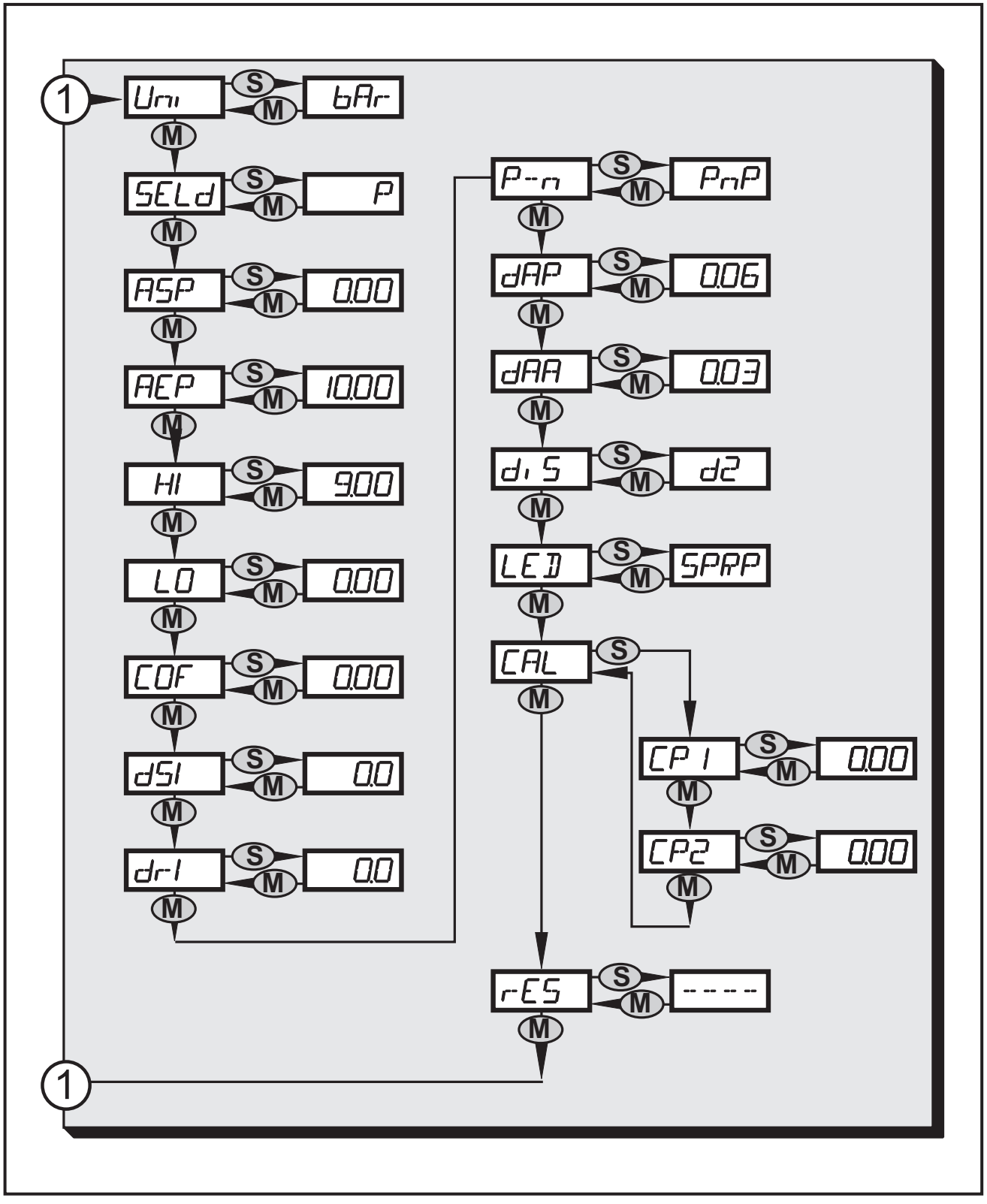


1: Change to menu level 2 (extended functions)

8.2 Explanation of the main menu

SP1/rP1	Upper / lower limit value for system pressure at which OUT1 switches.
OU1	Output function for OUT1: • Switching signal for the pressure limit values: hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].
OU2	Output function for OUT2: • Analogue signal for the current system pressure: 4...20 mA [I], 20...4 mA [InEG].
tCOF	Teach zero-point calibration.
tASP	Teach analogue start point for system pressure: set measured value at which 4 mA is provided (20 mA if [OU2] = [InEG]).
tAEP	Teach analogue end point for system pressure: set measured value at which 20 mA is provided (4 mA if [OU2] = [InEG]).
EF	Extended functions / opening of menu level 2.

8.3 Menu structure: level 2 (extended functions)



1: Change to the main menu

8.4 Explanation of the menu level 2

Uni	Standard unit of measurement for system pressure (bar or PSI).
SELd	Display mode: • Pressure in the unit set in [Uni]. • Pressure in % of the set scaling of the analogue output.
ASP	Analogue start point for system pressure: measured value at which 4 mA is provided (20 mA if [OU2] = [InEG]).
AEP	Analogue end point for system pressure: measured value at which 20 mA is provided (4 mA if [OU2] = [InEG]).
HI	Maximum value memory for system pressure.
LO	Minimum value memory for system pressure.
COF	Zero-point calibration.
dS1	Switch-on delay for OUT1.
dr1	Switch-off delay for OUT1.
P-n	Switching logic for OUT1: pnp or npn.
dAP	Damping for switching outputs and display.
dAA	Damping for analogue output (OUT2).
diS	Update rate and orientation of the display.
LED	Setting for the LED ring.
CAL	Calibration function (setting the curve of measured values).
CP1	Calibration point 1
CP2	Calibration point 2
rES	Restore factory settings.

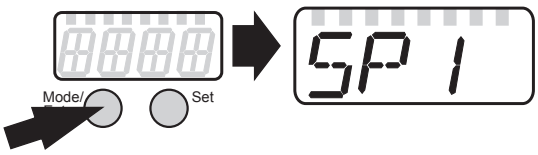
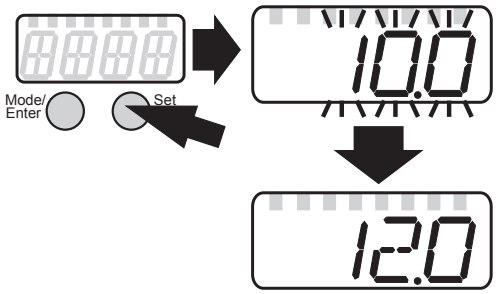
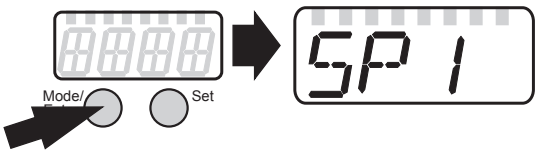
9 Parameter setting

During parameter setting the unit remains in the operating mode. It continues its monitoring function with the existing parameters until the parameter setting has been completed.

Exceptions: changes to the parameters COF (→ 9.4.1), CP1 and CP2 (→ 9.4.6) take effect immediately.

9.1 General parameter setting

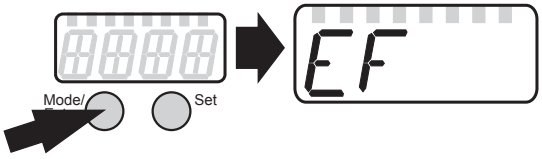
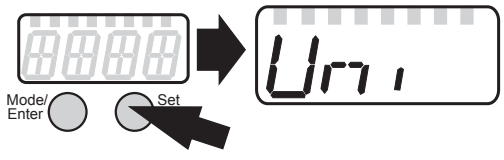
3 steps must be taken for each parameter setting:

1	**Select parameter** ▶ Touch [Mode/Enter] until the requested parameter is displayed.	
2	**Set parameter value** ▶ Touch [Set] and keep it touched. > Current setting value of the parameter flashes for 5 s. > After 5 s: setting value is changed: step by step by touching briefly several times or continuously by touching permanently.	
	Numerical values are incremented continuously. To reduce the value: let the display move to the maximum setting value. Then the cycle starts again at the minimum setting value.	
3	**Acknowledge parameter value** ▶ Touch [Mode/Enter] briefly. > The parameter is displayed again. The new setting value is saved.	
Set other parameters ▶ Start again with step 1.		
Finish parameter setting ▶ Touch [Mode/Enter] several times until the current measured value is displayed or wait for 15 s. > The unit returns to the operating mode.		

- Timeout:

  If no touch button is activated for 15 s during parameter setting, the unit returns to the operating mode with unchanged values.

- Change from menu level 1 to menu level 2:

▶ Touch [Mode/Enter] until [EF] is displayed.	
▶ Touch [Set] briefly. > The first parameter of the submenu is displayed (here: [Uni]). If the menu level 2 is protected by an access code, "Cod1" flashes in the display. ▶ Touch [Set] and keep it touched until the valid code no. appears. ▶ Touch [Mode/Enter] briefly. On delivery by ifm electronic: no access restriction.	

- Locking / unlocking

  The unit can be locked electronically to prevent an unintentional operation.

▶ Make sure that the unit is in the normal operating mode. ▶ Touch [Set], ▶ additionally touch [Mode/Enter] and keep both buttons touched for 10 s. > The LED for the current unit of measurement flashes, the current system pressure continues to be displayed. After 10 s the display goes out for approx. 1 s. ▶ Release [Mode/Enter] and [Set] again. Both buttons must be released within 4 s. If this does not happen, the unit remains unlocked. > [Loc] is displayed, the unit is locked. . During operation the indicator LED for the display unit (→ chapter 7) is flashing if you try to open the menu.
For unlocking: ▶ Make sure that the unit is in the normal operating mode. ▶ TTouch [Set], ▶ additionally touch [Mode/Enter] and keep both buttons touched for 10 s. > The LED for the current unit of measurement flashes, the current system pressure continues to be displayed. After 10 s the display goes out for approx. 1 s. ▶ Release [Mode/Enter] and [Set] again. Both buttons must be released within 4 s. If this does not happen, the unit remains unlocked. > [uLoc] is displayed, the unit is unlocked.

On delivery: unlocked.

9.2 Configuration of the digital display (optional)

▶ Select [Uni] and set the unit of measurement: - [bAr] / [mbAr]. - [PSI] / [inHO].	
▶ Select [SELd] and set type of indication: - [P]: system pressure in the unit set in Uni. - [P%]: system pressure in % of the set scaling of the analogue output; the following applies: 0 % = ASP value / 100 % = AEP value. Note: display “0 %” does not mean that no pressure is applied to the system.	
▶ Select [diS] and set the update rate of the display: - [d1]: update of the measured values every 50 ms. - [d2]: update of the measured values every 200 ms. - [d3]: update of the measured values every 600 ms. - [OFF] = The measured value display is deactivated in the Run mode. Touching one of the buttons indicates the current measured value for 15 s. Touching the [Mode/Enter] button again activates the display mode. The indicator LEDs remain active even if the display is deactivated.	
▶ Select [LED] and set the display function for the digital display and LED ring: - [SPRP]: The LED ring indicates set point and reset point. - [LO]: The LED ring indicates the saved minimum value for the system pressure. - [HI]: The LED ring indicates the saved maximum value for the system pressure. - [Ph]: Display of pulsating signals and pressure peaks: - In case of quick pressure changes (quickly pulsating signals) the digital display and LED ring indicate the minimum value and the maximum value. - In case of one-time short pressure peaks the digital display and LED ring show the indication for a longer time. - [Pdir]: The LED ring indicates the trend of the pressure changes (5 LEDs below the pointer for rising pressure; 5 LEDs above the pointer for falling pressure). A damping set with dAP or dAA also has an effect on this display.	

9.3 Set output signals

9.3.1 Set output functions

▶ Select [OU1] and set the switching function: - [Hno] = hysteresis function/NO. - [Hnc] = hysteresis function/NC. - [Fno] = window function/NO. - [Fnc] = window function/NC.	
▶ Select [OU2] and set the analogue function: - [I] = current signal proportional to pressure 4…20 mA. - [InEG] = current signal proportional to pressure 20…4 mA.	

9.3.2 Set switching limits

▶ Select [SP1] and set the value at which the output switches.	
▶ Select [rP1] and set the value at which OUT1 switches off. rP1 is always smaller than SP1. The unit only accepts values which are lower than SP1.	

9.3.3 Scale analogue value for OUT2

▶ Set the minimum pressure requested in the system. ▶ Touch [Mode/Enter] until [tASP] appears. ▶ Touch [Set] and keep it touched. > Current setting value flashes. ▶ Release [Set] when the display stops flashing. > New setting value is displayed. ▶ Touch [Mode/Enter] briefly. > The current system pressure is defined as start value for the analogue signal.	
▶ Set the maximum pressure requested in the system. ▶ Touch [Mode/Enter] until [tAEP] appears. ▶ Touch [Set] and keep it touched. > Current setting value flashes. ▶ Release [Set] when the display stops flashing. > New setting value is displayed. ▶ Touch [Mode/Enter] briefly. > The current system pressure is defined as end value for the analogue signal.	
ASP / AEP can only be set automatically within defined limits (→ 12.1 Setting ranges). If automatic setting is carried out at an invalid pressure value, [UL] or [OL] is displayed. After acknowledgement by [Mode/Enter] [Err] flashes, the ASP value / AEP value is not changed.	

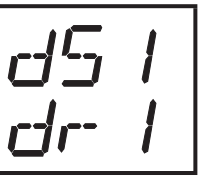
As an alternative: ▶ Select [ASP] and set the measured value at which 4 mA is provided (20 mA at [OU2] = [InEG]). ▶ Select [AEP] and set the measured value at which 20 mA is provided (4 mA at [OU2] = [InEG]). Minimum distance between ASP and AEP = 25 % of the final value of the measuring range (turn-down 1:4).	

9.4 User settings (optional)

9.4.1 Carry out zero point calibration

▶ Select [COF] and set a value between -5 % and 5 % of the final value of the measuring range. The internal measured value "0" is shifted by this value.	
As an alternative: automatic adjustment of the offset in the range 0 bar ± 5 %. ▶ Make sure that no pressure is applied to the system. ▶ Touch [Mode/Enter] until [tCOF] appears. ▶ Touch [Set] and keep it touched. > The current offset value (in %) flashes briefly. > The current system pressure is displayed. ▶ Release [Set]. ▶ Touch [Mode/Enter] briefly (= to confirm the new offset value).	

9.4.2 Set delay time for OUT1

[dS1] = switch-on delay / [dr1] = switch-off delay. ▶ Select [dS1] or [dr1] and set a value between 0.1 and 50 s (at 0.0 the delay time is not active).	

9.4.3 Set switching logic for OUT1

▶ Select [P-n] and set [PnP] or [nPn].	

9.4.4 Set damping for the switching signal

▶ Select [dAP] and set a value between 0.01 and 30 s. dAP value = response time between pressure change and change of the switching status in seconds. [dAP] influences the switching frequency: f_{max} = 1 ÷ 2dAP. [dAP] also has an effect on the display.	

9.4.5 Set damping for the analogue signal

▶ Select [dAA] and set a value between 0.01 and 30 s. dAA value = response time between pressure change and change of the analogue signal in seconds.	

9.4.6 Calibrate curve of measured values

If the unit is to adopt the settings for the calibration points, the following conditions must be adhered to:

- CP1 and CP2 must be within the measuring range (i.e. between ASP and AEP).
- CP1 and CP2 must not be in the extended display range.
- Minimum distance between the calibration points CP1 and CP2 = 5 % of the final value of the measuring range.
- Maximum correction value = ± 2 % of the final value of the final value of the measuring range.

UK

▶ Set a defined reference pressure between ASP and AEP in the system. ▶ Select [CAL]. ▶ Touch [Set] briefly. > [CP1] is displayed. ▶ Touch [Set] for 5 s. > The pressure measured by the unit is displayed. ▶ Touch [Set] until the set reference pressure is indicated (measured pressure = reference pressure) or the corresponding analogue signal is provided to OUT2. ▶ Touch [Mode/Enter] briefly. > [CP1] is displayed. ▶ Touch [Mode/Enter] briefly. > [CP2] is displayed. Continue with a) or b).	
a) Finish calibration: ▶ Touch [Mode/Enter] briefly. > [CAL] is displayed. b) Change a 2nd point on the curve of measured values: ▶ Set a second defined reference pressure in the system. ▶ Touch [Set] for 5 s. > The pressure measured by the unit is displayed. ▶ Touch [Set] until the set reference pressure is indicated (measured pressure = reference pressure) or the corresponding analogue signal is provided to OUT2. ▶ Touch [Mode/Enter] briefly. > [CP2] is displayed. ▶ Touch [Mode/Enter] briefly. > [CAL] is displayed, the process is finished.	

9.5 Service functions

9.5.1 Read min/max values for system pressure

▶ Select [HI] or [LO] and touch [Set] briefly. [HI] = maximum value, [LO] = minimum value. Delete memory: ▶ Select [HI] or [LO]. ▶ Touch [Set] and keep it touched until [----] is displayed. ▶ Touch [Mode/Enter] briefly.	

9.5.2 Reset all parameters to factory setting

▶ Select [rES]. ▶ Touch [Set] and keep it touched until [----] is displayed. ▶ Touch [Mode/Enter] briefly. It is recommended to take down your own settings in the table before carrying out a reset (→13 Factory setting).	

10 Operation

After power on, the unit is in the Run mode (= normal operating mode). It carries out its measurement and evaluation functions and provides output signals according to the set parameters.

Operating indicators → 7 Operating and display elements.

10.1 Read set parameters

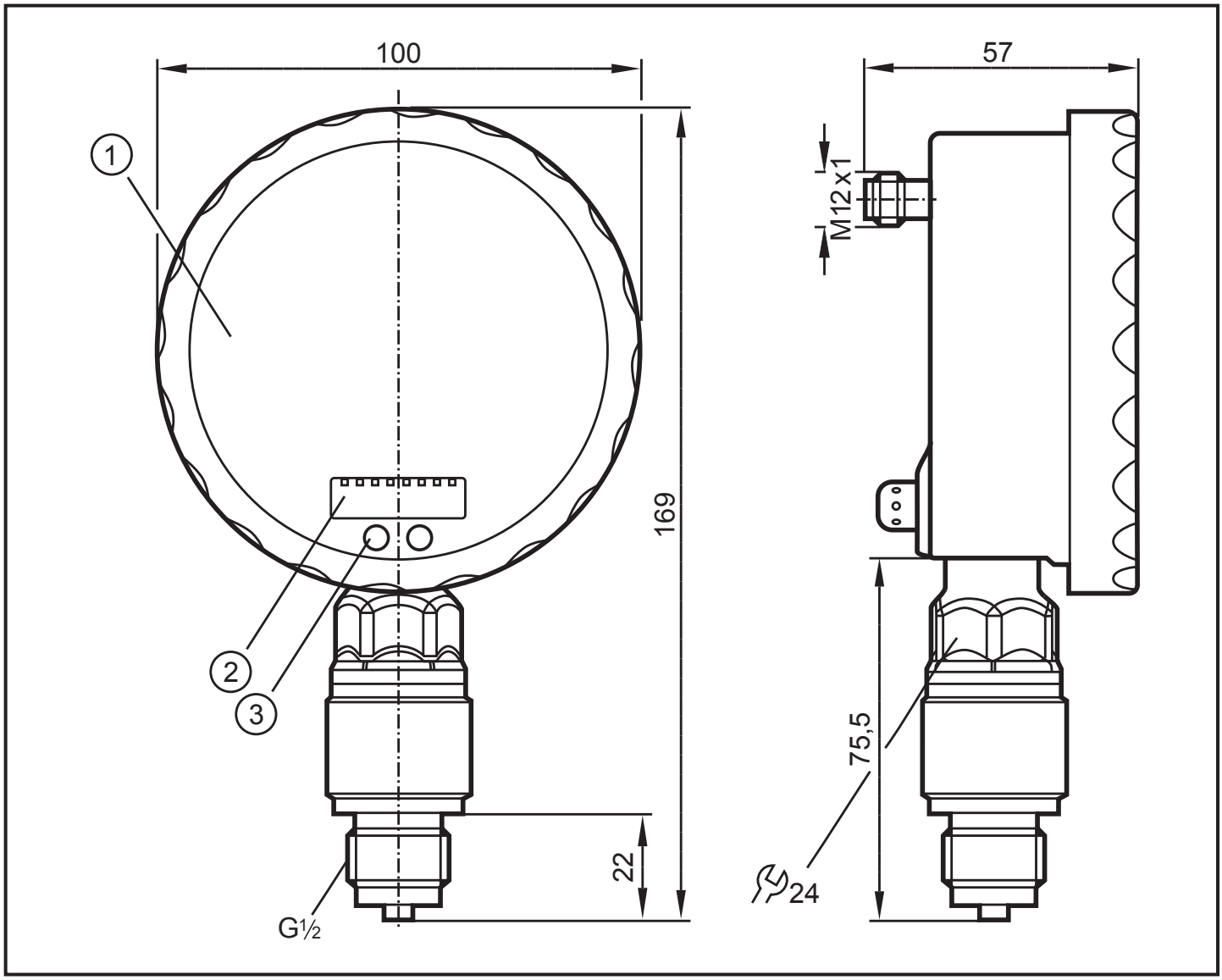
▶ Touch [Mode/Enter] until the requested parameter is displayed.
▶ Touch [Set] briefly.
> The unit displays the corresponding parameter value for about 15 s. After another 15 s it returns to the Run mode.

10.2 Error indications

[OL]	Overload pressure (measuring range exceeded).
[UL]	Underload pressure (below measuring range).
[SC1]	Short circuit in OUT1. The output is switched off as long as the short circuit persists.
[Err]	Flashing: internal error, invalid entry.

The messages SC1 and Err are displayed even if the display is switched off.

11 Scale drawing



Dimensions in mm
1: analogue display
2: digital display
3: touch button (programming button)

12 Technical data

Operating voltage [V]	18...32 DC
Current consumption [mA]	< 70 (24 V)
Current rating [mA]	250
Short-circuit protection; reverse polarity protection / overload protection, integrated watchdog	
Voltage drop [V]	< 2
Power-on delay time [s]	6
Min. response time switching output [ms]	9
Switching frequency [Hz]	75
Analogue output	4...20 mA / 20...4 mA
Max. load [Ω]	(Ub - 10) x 50
Step response time analogue output [ms]	28

Accuracy / deviations (in % of the span)[1)]

	PG2409 PG2452 ... PG2458	PG2450 PG2451 PG2489
Switch point accuracy	< ± 0.5	< ± 0.6
Switch point accuracy in the extended display range	< ± 1.5	< ± 1.5
Characteristics deviation	< ± 0.25 (BFSL) < ± 0.5 (LS)	< ± 0.35 (BFSL) < ± 0.6 (LS)
Hysteresis	< 0.25	< 0.5
Repeatability (in case of temperature fluctuations < 10 K)	< ± 0.1	< ± 0.1
Long-term stability (in % of the span / 6 months)	< ± 0.1	< ± 0.1

Temperature coefficients (TEMPCO) in the compensated temperature range 0 ...70°C (in % of the span per 10 K)

	PG2409 PG2452 ... PG2458	PG2450 PG2451 PG2489
Greatest TEMPCO of the zero point	< ± 0.2	< ± 0.3
Greatest TEMPCO of the span	< ± 0.2	< ± 0.3

Materials (wetted parts)	stainless steel 316L / 1.4404 ceramics (Al2O3); FPM
Housing materials	stainless steel 316L / 1.4404; PA; FPM (Viton); PTFE; viewing glass: laminated safety glass 4 mm
Protection rating	IP 67 / IP 69K
Protection class	III
Insulation resistance [MΩ]	> 100 (500 V DC)
Shock resistance [g]	50 (DIN IEC 68-2-27, 11 ms)
Vibration resistance [g]	20 (DIN IEC 68-2-6, 10 - 2000 Hz)
Switching cycles min.	100 million
Ambient temperature [°C]	-20 ... 80
Medium temperature [°C]	-25...80
Storage temperature [°C]	-40...100
EMC EN 61000-4-2 ESD:	4 / 8 kV
EN 61000-4-3 HF radiated:	10 V/m
EN 61000-4-4 Burst:	2 kV
EN 61000-4-5 Surge:	0.5 / 1 kV
EN 61000-4-6 HF conducted:	10 V

[1] 1) All indications are referred to a turn-down of 1:1

13 Setting ranges

		SP1		rP1		ASP		AEP		ΔP
		min	max	min	max	min	max	min	max	
PG2409	bar	-0.992	1.600	-1.000	1.592	-1.000	1.100	-0.500	1.600	0.004
	PSI	-14.40	23.22	-14.52	23.10	-14.52	15.96	-7.26	23.22	0.06
PG2450	bar	2	600	0	598	0	500	100	600	1
	PSI	30	8700	0	8670	0	7250	1450	8700	10
PG2451	bar	1.0	400.0	0.0	399.0	0.0	350.0	50.0	400.0	0.5
	PSI	15	5800	0	5785	0	5075	725	5800	5
PG2452	bar	0.4	160.0	0.0	159.6	0.0	135.0	25.0	160.0	0.2
	PSI	6	2322	0	2316	0	1959	363	2322	3

ΔP = step increment

		SP1		rP1		ASP		AEP		ΔP
		min	max	min	max	min	max	min	max	
PG2453	bar	-0.90	40.00	-1.00	39.90	-1.00	33.75	5.25	40.00	0.05
	PSI	-13.0	580.0	-14.5	578.5	-14.5	489.5	76.0	580.0	0.5
PG2454	bar	-0.96	16.00	-1.00	15.96	-1.00	13.50	1.50	16.00	0.02
	PSI	-14.0	232.0	-14.4	231.6	-14.4	195.8	21.8	232.0	0.2
PG2455	bar	-0.98	6.40	-1.00	6.38	-1.00	5.40	0.00	6.40	0.01
	PSI	-14.2	92.8	-14.5	92.5	-14.5	78.3	0.0	92.8	0.1
PG2456	bar	-0.115	4.000	-0.125	3.990	-0.125	3.350	0.525	4.000	0.005
	PSI	-1.65	58.00	-1.80	57.85	-1.80	48.60	7.60	58.00	0.05
PG2457	bar	-0.046	1.600	-0.050	1.596	-0.050	1.340	0.200	1.600	0.002
	PSI	-0.66	23.20	-0.72	23.14	-0.72	19.58	2.90	23.20	0.02
PG2458	mbar	-11.5	400.0	-12.5	399.0	-12.5	337.5	50.0	400.0	0.5
	inH2O	-4.6	160.6	-5.0	160.2	-5.0	135.6	20.0	160.6	0.2
PG2489	mbar	-4.6	160.0	-5.0	159.6	-5.0	135.0	20.0	160.0	0.2
	inH2O	-1.84	64.24	-2.00	64.08	-2.00	54.24	8.00	64.24	0.08

ΔP = step increment

14 Factory setting

	Factory setting	User setting
SP1	25.0 % VMR*	
rP1	24.9 % VMR*	
OU1	Hno	
OU2	I	
COF / tCOF	0.0	
ASP / tASP	0 % VMR*	
AEP / tAEP	100 % VMR*	
Uni	bAr / mbAr	
SELd	P	
dS1	0.0	
dr1	0.0	
P-n	pnp	
dAP	0.06	
dAA	0.03	
dis	d2	
LED	SPRP	
CP1	0.00	
CP2	0.00	

* = the indicated percentage of the final value of the measuring range (VMR) of the corresponding sensor is set.

More information at www.ifm.com